Develop, Document and Distribute.
3D GIS for Red Lodge

Submitted by the

City of Red Lodge

In conjunction with
Carbon County Montana
And the
Beartooth Front Community Forum

February 13, 2008

A grant application submitted to the
Montana Land Information Grant Program

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2. Other Project Participants or Partners:

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3. Date Submitted:	February 13, 2008
4. Date Received by State:	

5. Descriptive Title of Applicant's Project:
Develop, Document and Distribute. 3D GIS for Red Lodge

1. Project Goals & Objectives

The City of Red Lodge is experiencing accelerated residential growth on the periphery of its jurisdiction. The increased number of homes being built is raising many concerns about future land use, fire protection, water quality, and impacts to the visual character of the community. To address these and many other similar issues, the City is working with Carbon County to develop a coordinated city-county planning board. Also involved is the Beartooth Front Community Forum (BFCF), a local grassroots organization who is helping to identify key land use issues and facilitate communication between the City and County.

Each of these organizations would greatly benefit from accurate and timely map information, consistent across the two jurisdictions. Much of this information already exists, but in a format that is not easily accessed, interpreted or updated. This is the problem we propose to address in this MLIA grant application.

In May of 2006, the City spent over $40,000 with Horizons Inc. to produce a true-color, 0.5 foot resolution, orthophoto image of the City and its surrounding area. From this orthophoto, several thematic base layers were derived using photogrammetry at a scale of 1:1000. These detailed map layers currently exist as paper maps and AutoCAD files; both of which will see limited use in their current format. The City would like to make this information available to its staff and the general public, and realize a return on their investment.

The solution to this problem is to standardize and import these data into a Geographic Information System (GIS) and expand the use of GIS technology in both City and County governments.

To accomplish this, we have developed a "3D" (Develop, Document, and Distribute) GIS plan. Simply stated, this approach will 1) develop standardized framework layers at the local level, 2) document these data using metadata and demonstrate the cost benefit of having these data in GIS, and 3) distribute these data to both City and County jurisdictions to improve land use planning efforts. In addition, the project will deliver the metadata to the Montana GIS data portal so that other potential users may search for and access these data.

This project will meet Goal 1, Objective 1.1 of the Montana Land Information Plan for fiscal year 2009; to create consistent, accurate framework layers and make them available to a wide (multi-jurisdictional) audience.

2. Technical Approach

a. Scope of Work

Development. The first phase of this project will be to develop the necessary geodatabases to support City and County planning. This phase will begin with an abbreviated GIS needs assessment for each of the departments. The assessment will help determine what attribute information should be associated with the mapped features (e.g., water line diameter, man-hole invert distance, sidewalk condition, etc.). This will assist with the design of a comprehensive database schema to store existing and future attributes.

Upon completion of the database design, the AutoCAD layers created by Horizons and other engineering firms will be transformed from their local coordinate system to a standardized UTM projection. The files will then be converted into an Environmental Systems Research Institute (ESRI) geodatabase format following the Montana Spatial Data Infrastructure (MSDI) framework layer standards where possible. Framework layers to be converted include the orthophotograph, hydrography, hypsography, governmental units (i.e., city boundary), and critical structure features such as building footprints, electrical transmission, water distribution system, and sanitary/storm water sewer system. In addition to the framework layers, several non-framework layers will also be converted to GIS format including sidewalks, parking areas, trees, recreational facilities and zoning.

With the conversion completed, we will attribute the mapped features using various ancillary information (engineering reports, city records, surveying notes, local knowledge from department heads, etc.) to build a comprehensive geodatabase for the City.

Documentation. Once converted to geodatabase format, the data will be documented using the Federal Geographic Data Committee's (FGDC) content standards for geospatial metadata. **As stated in 2009 MLI Plan, "additional support at the data creation level will be needed to assist in developing and cataloging new metadata records across the spectrum of data producers that have geospatial and tabular records that relate to and information in Montana."** The City is in need of MLIA funding to ensure that metadata is developed and distributed through the State's GIS Data Portal.

Distribution. Distribution of these data will begin with a GIS demonstration to City and County officials. The goal is to showcase the technology using local data and provide practical, real-world examples of how it could be used by each department. Following the demonstration, we will package and deliver the data to the Departments using ArcReader[1] software. We believe distribution using ArcReader is a good introductory approach to expanding the use of GIS in the City and County because it is cost-effective and is easy to use. ArcReader training will be provided to all departments once the data and software are in place.

To encourage and facilitate the use of GIS during important Council work sessions and public meetings, we will also set up a digital projection system in the City council chambers and link it to a laptop running ArcReader. Widescreen projection of the ArcReader software will replace small-scale, thumb-tacked maps on the wall, and will greatly improve communication between city officials and the public.

b. Deliverables

Deliverables to the City, County and BFCF will include an ArcReader application containing documented MSDI framework layers in geodatabase format for the Red Lodge area.

[1] ArcReader is a free GIS software application developed by Environmental Systems Research Institute (ESRI) of Redlands California, the leading developer of GIS software worldwide.

Deliverables to the State will include FGDC-compliant metadata for distribution through the NRIS clearinghouse/Montana GIS Data Portal. **This component of our project is in coordination with Goal 1 of the 2009 MLI plan to make spatial data "commonly available" to a wide range of stakeholders.**

c. Acceptance Criteria

Successful completion of this project will result in a standardized set of MSDI framework layers for the Red Lodge area, adequately documented and readily available for distribution through local jurisdictions and through a statewide network of GIS users. We will consider this project a success if we complete all thee phases and are able to secure funding for future GIS development within the City's 2009 budget.

d. Timeline

This project has a planned duration of one year starting in June 2008 and ending in May 2009. The enclosed timeline shows the duration (by month) of tasks associated with each of the four phases.

e. Staff Roles

The Red Lodge Volunteer Fire Department (RLVFD) will administer this project because they are the department most involved with GIS and because they have the infrastructure to support GIS development in the City. The Department owns an incident command bus equipped with desktop GIS, mapping grade GPS and a large format printer for mobile emergency response. They also have a trained GIS professional on staff to help coordinate the Department's GIS activities.

The Department will be responsible for project administration, coordination between City and County departments, and will assist with GIS database development – an in-kind contribution totaling 100 hours.

1. **Geography Affected**

The geographic area encompassed by and immediately surrounding the City of Red Lodge will be positively affected by this project. The use of common, accurate and up-to-date basemaps, distributed though GIS will benefit the following government stakeholders:

City of Red Lodge	**Carbon County**
Planning Department	Planning/Sanitation Department
Public Works Department & Subcommittee	DES Office
Fire Department	Road & Bridge Department
Joint City/County Planning Board	

The map data produced from this project will also help the BFCF identify critical land use issues and promote informed land use decision making between local governments.

4. Expected Benefits

Stakeholders of this project will benefit by 1) improved communication of land resources and city infrastructure; 2) increased productivity and a shared cost savings by avoiding duplication of data collection and maintenance, and 3) an increased awareness of GIS technology and its many uses within local governments. In addition, having the metadata available on the State's GIS data portal will also benefit other jurisdictions, organizations and private entities in need of data for this area.

Without MLIA funding, the city will not see a return on investment on its recent purchase of data and future efforts to collect remotely-sensed data may be compromised. It is unlikely that metadata will be produced or will be done so in a haphazard manner, and there is little or no chance that these data will be available through the State's GIS data portal. Lastly, land use planners in the local governments will continue to lack the information needed to make informed decisions.

5. On-going commitment and maintenance

Our short term maintenance goal is to provide training and support to all end users for the period of this project. Also, a portion of the in-kind match provided by the City will be used to update the ArcReader databases on the individual desktop computers on a quarterly basis throughout 2008 and 2009.

Our long-term goal is to secure annual funding from the City's 2009 budget (and beyond) to establish and maintain an in-house GIS program. With the data prepared, documented, and demonstrated as being a vital component to City operations, we believe we can make a strong cost-benefit argument for the City to invest in GIS technology.

6. Detailed Budget

The total budget for this project is $37,650 with $31,650 being requested from the MLIA grant program. The city's contribution will consist of $6,000 in both hard and in-kind match. The hard money contributed by the City will be used to set up the digital projection system running GIS. The in-kind match will be provided by the RLVFD through the contribution of staff time developing the GIS databases (approximately 100 hours).

We are requesting $7,750 be granted to the RLVFD and the city administrator for project administration, coordination and GIS database development. We are also requesting $15,000 to cover the costs associated with hiring a GIS consultant to complete the GIS database development, documentation, publishing and training *(Note: an estimate of $15k was provided to us by a local GIS consultant for reference).* The remaining funds will be used primarily on hardware (1 laptop/printer) and software (1 Arcview and 1 ArcPublisher extension license).

Category	Applicant Share (including in-kind)	MLIA Share	Other Share	Total
a. Personnel **RLVFD** **City Admin**	2500 (in kind)	7500 250		
b. Fringe Benefits				
c. Travel		100		
d. Equipment **Software** **Hardware** **Projection system**	3500	4300 3500		
e. Supplies		500		
f. Contractual		15000		
g. Other		500		
Totals	**$6000**	**$31650**		**$37650**

7. Statements of support must be included from any party listed as a partner. Other statements of support will not be evaluated and should not be submitted (not counted toward 5 page limit). The City of Red Lodge is the only financial partner in this project so no other statements of support are included.

8. Renewable Grant Accountability Report - If you received a 2008 MLIA Grant you must file a report documenting the progress you have made toward meeting the requirements of that grant. The City of Red Lodge did not apply for a 2008 MLIA grant so no progress report is included in the application.

9. Authorized Signature

Authorizing Statement
I hereby certify that the information and all statements in this application are true, complete and accurate to the best of my knowledge and that the project or activity complies with all applicable state, local and federal laws and regulations.
I further certify that this project will comply with applicable statutory and regulatory standards.
I further certify that I am (we are) authorized to enter into a binding agreement with the Montana Department of Administration to obtain a grant if this application receives approval.

_____ **Date**_____

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Signature and Title of Authorized Representative(s) of Public Entity Applicant